United States General Accounting Office

GAO

Report to the Honorable
Tom Harkin, U.S. Senate

October 1999

DEFENSE ACQUISITIONS

Army Purchased Truck Trailers That Cannot Be Used as Planned

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

19991029 016

GAO
Accountability * Integrity * Reliability

GAO/NSIAD-00-15

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

GAO
Accountability * Integrity * Reliability

United States General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-283452

October 27, 1999

The Honorable Tom Harkin
United States Senate

Dear Senator Harkin:

The Army has purchased 6,700 ¾-ton High Mobility Trailers as companion trailers for the High Mobility Multipurpose Wheeled Vehicles, 1¼-ton trucks. The Army is buying two types of trailers. A cargo trailer that will be used to carry loose cargo, such as ammunition boxes, and a chassis trailer, which will be used to permanently attach towed equipment, such as power generators. The trailers' unit price has significantly increased and generally they cannot be used as planned until modifications are made to the trailers and the trucks that tow them. The Army plans to acquire 18,412 more of the trailers. In response to your request, we (1) determined factors leading to the substantial increase in the contract unit price of the trailers, (2) identified reasons the trailers cannot be used as planned and the cost to the Army for required modifications, and (3) assessed the Army's acquisition strategy and plans to procure additional trailers.

Results in Brief

The Army has paid a much higher unit price for the High Mobility Trailers than it originally expected primarily because it awarded a $50.6-million, 5-year, multiyear contract to produce 7,563 trailers and then decided not to fund the fourth year of the contract. A program official said that the Army did not fund the fourth year of the contract because of other higher funding priorities. The multiyear contract required the cancellation of the fourth and fifth years of production if the fourth year was not funded. Rather than cancel the final 2 years of the contract, the Army and the contractor agreed to a restructured contract. At the time the contract was restructured, the contractor was more than a year behind the original delivery schedule and had incurred additional costs in modifying the trailer to meet requirements. The restructured contract reduced annual production quantities; extended production a year; and increased the price of each cargo trailer by 57 percent, from $6,710 to $10,521, and each chassis trailer by 50 percent, from $3,560 to $5,334. The increase in unit price was attributed primarily to spreading overhead costs over fewer units, allowing for higher labor and material costs, and an increase in the contractor's profit percentage.

Most of the 6,700 High Mobility Trailers the Army has purchased are (1) not usable because of a safety problem and (2) not suitable because they damage the light and heavy trucks towing them.[1] In addition to damaging the truck, the Army found that the trailer drawbar could break, causing a safety problem. If it breaks, the trailer can disconnect from the truck or overturn. The Army has placed all 5,696 cargo trailers and 854 of the chassis trailers into storage until they are modified to correct the problem. The modifications to correct the trailer drawbar problem caused additional problems with the trailer brakes and additional damage to the trucks. Since it had accepted the trailer design, the Army determined that it would pay for the required modifications. To make the trailers usable and suitable, the Army needs to make three modifications to the trailers and one modification to each type of truck. It has identified two of the trailer modifications that will cost an additional $640 for each trailer and a truck modification that will cost an additional $250 for each heavy truck. However, it has not yet identified the other trailer modification or the light truck modification.

The Army's acquisition strategy underestimated the risks. The Army, based on its belief that only minor modifications to an existing trailer design were required, entered into a multiyear production contract without demonstrating that the design would meet its requirements. Further, the contract required the contractor to design, produce, and deliver trailers within 150 days of contract award. The Army subsequently found that the contractor could not meet the contract's original delivery schedule, the trailers initially did not pass testing, and the initial trailer design required significant modifications. It plans to award a competitively bid, 5-year requirements contract sometime after fiscal year 2002 begins to acquire more High Mobility Trailers. The Army is in the early stages of planning for this contract and has not worked out many of the details. It is revising the trailer specifications and as a result, the new contract may include a new trailer design.

This report contains a recommendation to the Secretary of Defense to require the Army, before beginning production of the follow-on trailers, to demonstrate the design will meet requirements and will not damage the

[1]The light trucks are the High Mobility Multipurpose Wheeled Vehicles that were produced with a frame cross member instead of a rear bumper and can tow up to 3,400 pounds, including the trailer and its load. The heavy trucks are the High Mobility Multipurpose Wheeled Vehicles that were produced with a rear bumper and can tow up to 4,200 pounds, including the trailer and its load.

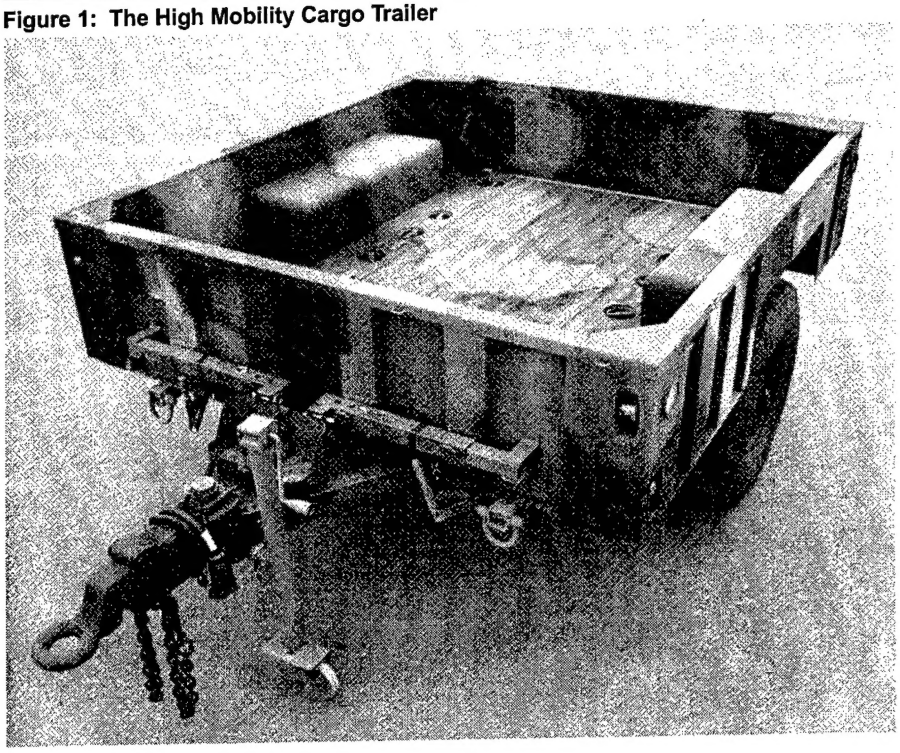
trucks. In its comments to the report, the Department of Defense concurred with this recommendation.

Background

In 1987, the Army decided it needed a new companion trailer for the High Mobility Multipurpose Wheeled Vehicle to provide improved off-road mobility and carry heavier loads compared to the then current M101 series ¾-ton military trailer. The Army found that the M101 series trailer lacked stability because its wheels did not have the same tire track width as the High Mobility Multipurpose Wheeled Vehicle and its suspension was not adequate. As a result, the trailer had a tendency to overturn, even at low speeds, in soft soil and rough terrain.

The new trailer (see fig. 1) was designed to be compatible with both the light and heavy High Mobility Multipurpose Wheeled Vehicles. Differences in the two trucks required that two cargo versions of the trailers be produced. The light cargo trailer was to carry at least 1,500 pounds and the heavy cargo trailer was to carry at least 2,500 pounds. The new trailers also included a chassis version that was to carry at least 2,700 pounds. The Army required the trailers to have the same track width and tires as the truck and inertia brakes, called surge brakes, which are actuated by forces between the tow hitch of the truck and the drawbar of the trailer. The trailer was to be capable of being towed at speeds up to 20 miles per hour cross-country, 35 miles per hour on secondary roads, and 55 miles per hour on primary roads.

Figure 1: The High Mobility Cargo Trailer



Source: Raytheon E-Systems Richardson.

On October 27, 1993, the Army awarded a $50.6-million, multiyear, firm fixed-price, 5-year production contract, with options, to Electrospace Systems, Inc., Richardson, Texas, to produce 7,563 trailers for active, guard, and reserve Army units. Electrospace subcontracted with Silver Eagle Manufacturing Co., Portland, Oregon, for the actual production of the trailers. Silver Eagle based its new trailer design on a High Mobility Multipurpose Wheeled Vehicle trailer it had designed earlier for an Army demonstration program. Silver Eagle had previously sold 15 of these trailers for demonstration programs, both inside and outside the Army. Electrospace and Silver Eagle had to modify the earlier military trailer to meet the new requirements. Electrospace became part of Raytheon E-Systems, Inc., in June 1996.

The contract was restructured, effective on December 27, 1996. The Army fielded the first 740 trailers to Army Reserve and National Guard units. The contractor produced 6,700 trailers at a total price of $57 million under the

restructured contract. The contractor had delivered all the trailers required by the restructured contract by the end of July 1999.

Contract Unit Price of Trailers Increased Significantly

The Army has paid a much higher unit price for the High Mobility Trailers than it originally expected, primarily because it awarded a multiyear, 5-year production contract that required it to fully fund each year by a specific date or cancel the remaining production years and then decided not to fund the fourth year of the contract. Rather than cancel the remaining production years, the Army and the contractor decided to restructure the contract. The restructuring reduced the number of trailers to be produced and allowed the contractor to reprice the trailers based on then-current costs. This resulted in a 57-percent increase, from $6,710 to $10,521, in the unit price of the cargo trailers and a 50-percent increase, from $3,560 to $5,334, in the unit price of the chassis trailers.

In developing its fiscal year 1997 budget request, the Army decided not to fund the High Mobility Trailer program. A program official said that the Army cited higher funding priorities as the reason for not funding the trailer program. The funding was required for the fourth year of the 5-year production contract. Under the terms of the multiyear contract, if the required funds were not available by the required date, the Army would have to cancel the remainder of the contract and pay the contractor for reasonable and necessary costs incurred and a reasonable profit on those costs. The contract limited these costs to no more than $1.1 million for cancellation of the contract's fourth and fifth production years.

Rather than cancel the contract, the Army and the contractor negotiated a restructured contract, effective December 27, 1996. According to program office officials, they believed the benefits of continuing the contract outweighed the costs of cancellation. On December 23, 1996, 4 days before the restructure, the Army informed the contractor that the trailers had successfully completed the testing to show that they met contract performance requirements. At that time, the contractor was more than a year behind the original delivery schedule and had incurred additional costs in modifying the trailers to meet requirements. However, the Army did not allow the contractor to recoup the additional costs on the restructured contract.

Under the restructured contract, the original fourth and fifth years of production were terminated and a lower total production quantity was established and spread over 3 years of production. The original contract

called for 4,534 trailers to be produced in the last 2 program years. The restructured contract reduced this number to 2,300 trailers to be produced over 3 years. The restructured contract allowed the contractor to increase its unit prices to $10,521 per trailer for the two cargo trailer versions, an increase of 57 percent over their original unit price of $6,710, and to $5,334 per trailer for the chassis trailer version, an increase of 50 percent over its original unit price of $3,560. The negotiations leading to the restructured contract attributed the increased unit price to spreading overhead costs over fewer units, allowing for higher labor and material costs, and increasing the contractor's profit percentage.

Trailers Are Not Usable With Trucks Until the Army Modifies Them

Most of the 6,700 High Mobility Trailers the Army has purchased are (1) not usable because of a safety problem and (2) not suitable because they damage the trucks towing them. The Army found that the trailer drawbar could break causing a safety problem. If it breaks, the trailer could disconnect from the truck or overturn. The Army has stored all 5,696 cargo trailers and 854 of the chassis trailers until they are modified to correct the problem. The modification to correct the trailer drawbar problem caused additional problems with the trailer brakes and additional damage to the trucks. Because it had previously accepted the trailer design, the Army determined that it would pay for the required modifications identified since the acceptance. The Army will pay an additional $640 per trailer for required trailer modifications but has not yet determined the modification needed to correct the trailer's brakes. The Army also will pay $250 per heavy truck for a modification, but it has not determined the required modification for the light truck. Because the Army has not determined all the required modification, the total program or unit cost to the Army for the trailers is unknown.

In July 1995, the Army Operational Evaluation Command performed an operational assessment of the trailers using data generated during production testing. It found that (1) the trailer demonstrated the potential for causing catastrophic failure in the truck due to cracking of the truck's rear cross member and (2) the heavy truck jack was not compatible with the trailer, which did not have a requirement to have a tire jack of its own. The Command assessed the trailers as effective but not suitable for Army use primarily because of the damage to the truck. It recommended that the cause of the truck damage be investigated and corrected before approving the trailers for full fielding.

Although the trailers damaged the trucks towing them during testing, the Army concluded that the design met contract performance requirements. The program office did not believe the truck damage was a major problem because only three of the trucks were damaged during testing. Rather than correcting the truck damage problem before fielding, the Army, on December 23, 1996, informed the contractor that the trailers had successfully completed testing and that it would accept all trailers built to their designs. The Army fielded the first 740 trailers to Army Reserve and National Guard units without correcting the problem.

To prevent the trailer from damaging the trucks, the Army developed bumper and cross member modifications. In testing the truck modifications, on November 14, 1997, the trailer drawbar broke. In analyzing the drawbar design, the Army determined that the drawbar had no margin of safety when the trailer was fully loaded and the drawbar was bending when going over a bump or rough spot. Since it had accepted the trailer design, the Army determined that it would pay for the required modifications.

On March 3, 1998, the U.S. Army Tank-automotive and Armaments Command issued a safety-of-use message requiring the Army to stop using all High Mobility Trailers, except about 150 chassis versions with generators mounted on them. These trailers were excluded because their operational weight was lower than that of the cargo trailers and would not break a drawbar. Since the message, the Army has been accepting trailers from the contractor and immediately placing them in storage at various locations around the country until the necessary modifications can be made. It has 5,696 cargo trailers and 854 chassis trailers in storage.

To correct the drawbar problem, the Army developed a new drawbar with a steel center bar to replace the trailer's original all aluminum drawbar. It began testing trailers modified with the new drawbar on May 8, 1998. The modified drawbar was stiffer that the original drawbar, and the Army found that it accelerated the wear on the surge brake actuator housing[2] and caused more damage to the trucks than the original drawbar.

[2]The surge brake actuator housing is located on the trailer drawbar and contains the surge brake actuator, which is basically a piston that the truck slowing down or accelerating moves to compress or expand hydraulic fluid that, in turn, cause the trailer brakes to engage or disengage.

On July 8, 1999, the Army completed its latest test of truck and trailer modifications. Some of the modifications were successful and some were not. The trailer drawbar modification was successful because it did not fail during testing, and the heavy truck bumper modification kept the trailers from damaging the heavy trucks. However, the trailer brake actuator and light truck modifications were not successful since the surge brake actuator housing cracked and parts wore out and the trailer continued to damage the light trucks.

A program official said that the heavy truck trailer will need a heavier surge brake actuator and the light truck will need additional reinforcement to its rear cross member. As of September 27, 1999, the Army had not decided on the surge brake actuator housing modification or the light truck modification needed to correct the problems. The program official also said that most of the stored trucks would not be retrofitted with the drawbar and surge brake modifications until the surge brake problem is corrected and demonstrated either through modeling and simulation or actual testing. However, he added that because units had to turn in their older trailers before being issued the new trailer, the program office is seeking approval to immediately retrofit the modified drawbar onto the 740 fielded trailers. The retrofit will allow the units to use the trailer up to 10 miles-per-hour cross-country as long as they inspect the trailers and trucks more often.

The final unit cost of the trailers cannot be determined until the Army identifies all of the trailer and truck modifications needed to make the trailers suitable for Army use. Since the Army will pay for these modifications, these costs should be added to the contract unit price of the trailers to obtain the total unit cost for the trailers. The Army has determined that each trailer needs (1) a jack adapter costing $60 that will allow the heavy truck tire jack to be used on the trailers and (2) the drawbar modification estimated to cost $580. These will increase the unit cost to $7,350 for cargo trailers and $4,200 for chassis trailers bought before the contract was restructured and $11,161 for cargo trailers and $5,974 for chassis trailers bought after the contract was restructured. The modification cost to solve the surge brake actuator problem should be added to these costs once the Army identifies the required modification.

In addition to determining the cost of the trailer modifications, the cost to modify the trucks needs to be determined to arrive at the Army's total cost for the trailer program. The Army estimates the modification on the heavy trucks will cost $250 per truck. However, the Army has not determined the

modification for the light trucks. Also, the Army has not determined the number of trucks that need to tow the trailer and therefore would need the modifications. The Army was surveying the units that have the trucks to determine their requirements for towing the trailer.

Army's Acquisition Strategy Underestimated Risks

The Army, based on its belief that only minor modifications to an existing trailer design were required, entered into a multiyear, 5-year production contract without demonstrating that the design would meet its requirements. The Army subsequently found that the contractor could not meet the original delivery schedule, the trailers initially did not pass testing, and the initial trailer design required significant modifications. The Army is in the early stages of planning for the follow-on purchase of trailers. The follow-on contract may include a new trailer design.

The Army awarded the multiyear production contract because it believed that its High Mobility Trailer requirements could be met by making minor modifications to an existing Silver Eagle trailer. Its market investigation prior to contract award determined that both Silver Eagle and another manufacturer had existing trailers that met 92 percent of the Army requirements. However, this determination was based upon the manufacturers' statements, not on Army tests. The trailer contract, awarded to Electrospace, required the contractor to design, produce, and deliver the first 12 trailers for testing within 150 days of contract award. The contractor was from 4 to 6 months late in delivering the first 12 trailers, which were initially unable to meet the contract requirements because of excessive wear to the axle and surge brake actuator. The contractor replaced the original axle with a stronger one and modified the trailer's surge brake actuator. The Army tested the modified trailers and, while it determined that the axle problem had been fixed, it raised continuing concerns about wear to the surge brake actuator. However, rather than requiring further modifications to the brake, the Army accepted a surge brake system warranty from the contractor. On December 23, 1996, the Army informed the contractor that the trailers had successfully completed the testing to show that they met contract performance requirements and that it would accept all trailers built to the same configuration as those that had successfully completed testing.

The Army plans to acquire 18,412 more High Mobility Trailers and to continue the trailer program with the award of a 5-year requirements contract. Originally, the Army planned to award this contract in March 2000; however, problems with the trailers and an Army decision not to fund

the program in fiscal year 2001 will delay the contract award until October 2001 at the earliest.

The Army is in the early stages of planning for this contract and has not worked out many of the details of the follow-on production, but it is revising the trailer specifications. For example, the program office has considered allowing the next contractor to produce the new trailers with a brake system other than an inertia brake system. The current surge brake system resulted from the requirement that the original trailers have an inertia brake system. As a result of revising the trailer specifications, the new contract may include a new trailer design.

Conclusions

The Army's acquisition strategy for High Mobility Trailers underestimated the risks of entering into a multiyear, 5-year production contract before demonstrating that the trailer's design met its requirements. As a result, the trailers cannot be used as planned, and the Army and the contractor have incurred substantial additional costs to fix problems. The Army's plan for the follow-on purchase of trailers may include a new design, but it is not clear yet if the Army plans to demonstrate, prior to production, that the new design will meet its requirements.

Recommendation

To ensure that the Army does not again acquire trailers that need substantial modifications before being fielded, we recommend that the Secretary of Defense require the Army, before proceeding with follow-on production of the trailer, to demonstrate the design will meet requirements and will not damage the trucks.

Agency Comments

In commenting on a draft of this report, the Department of Defense concurred with the recommendation, stating that before proceeding with the follow-on procurement of the trailer, the Army will perform testing to demonstrate that the trailer design meets operational requirements and will not damage the truck towing it. The Department added that the Army has reviewed the original trailer strategy and its execution to develop an improved strategy for the follow-on trailer procurement. In addition, the Department stated that the Army is refining the trailer performance specification and developing a more rigorous testing plan that will evaluate trailer and truck performance as an integrated system.

Scope and Methodology

To identify the factors leading to a substantial increase in the trailer's contract unit price and the reasons the Army cannot use most of the trailers until modifications are made, we reviewed the original market investigation report, the Army's acquisition strategy, contract files, program schedules, test plan and reports, and other program documents. We discussed implications of the documentation with program and test officials.

To assess the Army's acquisition strategy and plans to procure additional trailers, we reviewed the High Mobility Trailer acquisition strategy and plan, Army budget documents, and other program documents. We discussed the evolving plans with Army program officials involved in planning the follow-on trailer contract.

In performing our work, we obtained documents and interviewed officials from the Offices of the Secretary of Defense and the Army, Washington, D.C.; the U.S. Army Tank-automotive and Armaments Command, Warren, Michigan; and the U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, Maryland.

We conducted our review between May and September 1999 in accordance with generally accepted government auditing standards.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies of the report to Senator John W. Warner, Chairman, and Senator Carl Levin, Ranking Minority Member, Senate Committee on Armed Services; Senator Ted Stevens, Chairman, and Senator Daniel K. Inouye, Ranking Minority Member, Subcommittee on Defense, Senate Committee on Appropriations; Representative Floyd D. Spence, Chairman, and Representative Ike Skelton, Ranking Minority Member, House Committee on Armed Services; and Representative Jerry Lewis, Chairman, and Representative John P. Murtha, Ranking Minority Member, Subcommittee on Defense, House Committee on Appropriations. We will also send copies of this report to the Honorable William S. Cohen, Secretary of Defense; the Honorable Louis Caldera, Secretary of the Army; and the Honorable Jacob J. Lew, Director, Office of Management and Budget. We will make copies available to others on request.

If you or your staff have any questions concerning this report please call Robert J. Stolba or me on (202) 512-4841. Major contributors to this report are Lawrence Gaston, Jr.; Stephanie J. May; and William T. Woods.

Sincerely yours,

James F. Wiggins
Associate Director
Defense Acquisitions Issues

Comments From the Department of Defense

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON DC 20301-3000

ACQUISITION AND TECHNOLOGY

Mr. Louis J. Rodrigues
Director, Defense Acquisition Issues
National Security and International Affairs Division
U.S. General Accounting Office
Washington, D.C. 20548

01 OCT 1999

Dear Mr. Rodrigues:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "DEFENSE ACQUISITIONS: Army Purchased Truck Trailers That Can Not Be Used As Planned," dated September 1, 1999 (GAO Code 707416/OSD Case 1887). DoD concurs with the GAO recommendation as stated in the enclosure.

The Department appreciates the opportunity to comment on the draft report.

Sincerely,

George R. Schneiter
Director
Strategic and Tactical Systems

Enclosure

General Accounting Office Draft Report
"ARMY ACQUISITIONS: Army Purchased Truck
Trailers That Can Not Be Used As Planned,"
dated September 1, 1999
(GAO Code 707416/OSD Case 1887):

DEPARTMENT OF DEFENSE COMMENTS
TO THE GAO RECOMMENDATION

Now on p. 10

RECOMMENDATION: To assure that the Army does not again acquire trailers that need substantial modifications before being fielded, the GAO recommended that the Secretary of Defense require the Army, before proceeding with follow-on production of the trailer, to demonstrate the design will meet requirements and will not damage the trucks. (p. 10/Draft Report)

See p. 10

DOD RESPONSE: Concur. Before proceeding with the follow-on procurement of High Mobility Trailers (HMT), the Army will perform testing to demonstrate that the trailer design meets operational requirements and will not damage its prime mover, the High Mobility Multipurpose Wheeled Vehicle (HMMWV). The Army has reviewed the original HMT procurement strategy and its execution, to develop an improved strategy for the follow-on HMT procurement. They have begun to develop a refined HMT performance specification and a more rigorous testing plan that, in addition to other enhancements, will evaluate the HMT and HMMWV performance as an integrated system.

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are $2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary, VISA and MasterCard credit cards are accepted, also.

Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

U.S. General Accounting Office
P.O. Box 37050
Washington, DC 20013

or visit:

Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders may also be placed by calling (202) 512-6000 or by using fax number (202) 512-6061, or TDD (202) 512-2537.

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (202) 512-6000 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

For information on how to access GAO reports on the INTERNET, send an e-mail message with "info" in the body to:

info@www.gao.gov

or visit GAO's World Wide Web Home Page at:

http://www.gao.gov

PRINTED ON RECYCLED PAPER